**CHAPTER 22**

**MANAGEMENT CONTROL SYSTEMS, TRANSFER PRICING,**

**AND MULTINATIONAL CONSIDERATIONS**

**22-1** A management control system is a means of gathering and using information to aid and coordinate the planning and control decisions throughout an organization and to guide the behavior of its managers and employees. The goal of the system is to improve the collective decisions within an organization.

**22-2** To be effective, management control systems should be (1) closely aligned to an organization's strategies and goals, (2) designed to support the organizational responsibilities of individual managers, and (3) able to motivate managers and employees to put in effort to attain selected goals desired by top management.

**22-3** Motivation combines goal congruence and effort. Motivation is the desire to attain a selected goal specified by top management (the goal-congruence aspect) combined with the resulting pursuit of that goal (the effort aspect).

**22-4** The chapter cites four benefits of decentralization:

1. Creates greater responsiveness to local needs

2. Leads to gains from faster decision making

3. Assists management development and learning

4. Sharpens the focus of subunit managers

The chapter cites four costs of decentralization:

1. Leads to suboptimal decision making

2. Focuses managers’ attention on the subunit rather than the company as a whole

3. Increases costs of gathering information

4. Results in duplication of activities

**22-5** No. Organizations typically compare the benefits and costs of decentralization on a function-by-function basis. For example, companies with highly decentralized operating divisions frequently have centralized income tax strategies.

**22-6** No. A transfer price is the price one subunit of an organization charges for a product or service supplied to another subunit of the same organization. The two segments can be cost centers, profit centers, or investment centers. For example, the allocation of service department costs to production departments that are set up as either cost centers or investment centers is an example of transfer pricing.

**22-7** The three general methods for determining transfer prices are

1. market-based transfer prices,

2. cost-based transfer prices, and

3. hybrid transfer prices.

**22-8** Transfer prices should have the following properties. They should

1. promote goal congruence,

2. be useful for evaluating subunit performance,

3. motivate management effort, and

1. preserve a high level of subunit autonomy in decision making.
	1. No, the chapter illustration demonstrates how division operating incomes differ dramatically under the variable-cost, full-cost, and market-price methods of transfer pricing.
	2. Transferring products or services at market prices generally leads to optimal decisions when (1) the market for the intermediate product market is perfectly competitive,
	(2) interdependencies of subunits are minimal, and (3) there are no additional costs or benefits to the company as a whole from buying or selling in the external market instead of transacting internally.

**22-11** One potential limitation of full-cost-based transfer prices is that they can lead to suboptimal decisions for the company as a whole. An example of a conflict between divisional action and overall company profitability resulting from an inappropriate transfer-pricing policy is buying products or services outside the company when it is beneficial to overall company profitability to source them internally. This situation often arises where full-cost-based transfer prices are used. This situation can make the fixed costs of the supplying division appear to be variable costs of the purchasing division. Another limitation is that the supplying division may not have sufficient incentives to control costs if the full-cost-based transfer price uses actual costs rather than standard costs.

 The purchasing division sources externally if market prices are lower than full costs. From the viewpoint of the company as a whole, the purchasing division should source from outside only if market prices are less than variable costs of production, not full costs of production.

**22-12** Reasons why a dual-pricing approach to transfer pricing is not widely used in practice include the following:

1. In this approach, the manager of the supplying division uses a cost-based method to record revenues and does not have sufficient incentives to control costs.

2. This approach does not provide clear signals to division managers about the level of decentralization top management wants.

1. This approach tends to insulate managers from the frictions of the marketplace because costs, not market prices, affect the revenues of the supplying division.
2. It leads to problems in computing the taxable income of subunits located in different tax jurisdictions.

**22-13** Disagree. Cost and price information are often useful starting points in the negotiation process. Costs, particularly variable costs of the selling division, serve as a “floor” below which the selling division would be unwilling to sell. Prices that the buying division would pay to purchase products from the outside market serves as a “ceiling” above which the buying division would be unwilling to buy. The price negotiated by the two divisions will, in general, have no specific relationship to either costs or prices. But the negotiated price will generally fall between the variable costs-based floor and the market price-based ceiling.

**22-14** Yes. The general transfer-pricing guideline specifies that the minimum transfer price equals the *incremental cost per unit* incurred up to the point of transfer *plus* the *opportunity cost* *per unit* to the supplying division. When the supplying division has idle capacity, its opportunity cost per unit is zero; when the supplying division has no idle capacity, its opportunity cost per unit is positive. Hence, the minimum transfer price will vary depending on whether the supplying division has idle capacity or not.

* 1. Alternative transfer-pricing methods can result in sizable differences in the reported operating income of divisions in different income tax jurisdictions. If these jurisdictions have different tax rates or deductions, the net income of the company as a whole is significantly affected by the choice of the transfer-pricing method.

**22-16** (15 min.) **Evaluating management control systems, balanced scorecard.**

1. Correct answers may include any of the following:

* Financial perspective—stock price, net income, return on investment, cash flow from operations, cost per visitor, gross margin percentage in retail venues
* Customer perspective—percentage of repeat visitors, customer satisfaction, ratings by travel organizations, cleanliness ratings
* Internal-business-process perspective—wait time and number of riders per hour for popular rides, accident-free days, downtime for repairs
* Learning-and-growth perspective—employee satisfaction, return employees, training hours, absenteeism

2. Each manager would be concerned with management controls related specifically to their level of responsibility. Within the financial perspective, for example, the souvenir shop manager might be concerned with controlling gross margin percentage or inventory turnover, the theme park manager might be concerned with gate proceeds or cash flow from operations, and the CEO might be concerned with stock price or earnings per share. Within the customer perspective, the souvenir shop manager might be concerned with sales per customer, the theme park manager might be concerned with percentage of repeat visitors, and the CEO might be concerned with travel organization ratings across the entire group of parks.

**22-17** (25 min.) **Cost centers, profit centers, decentralization, transfer prices**.

1. The Glass Department sends its product to the Wood and Metal Departments for finishing. The Glass Department does not negotiate internal prices. The Glass, Wood, and Metal Departments are cost centers because they are only evaluated on output and cost control (cost variances).
2. The three departments are centralized because upper management dictates their production schedules.
3. A centralized department can be a profit center. Centralization relates to the degree of autonomy that a department has for decision making. This concept is independent of the type of responsibility center used to evaluate performance (for example the Glass Department could be a profit center if upper management chooses a transfer price for the glass transferred from the Glass to the Wood and Metal Departments). A department may be organized as a profit center, but it will be centralized if it has little freedom in making decisions.
4. a. With these changes, Fenster will be moving toward a more decentralized environment because each department will have more local decision-making authority, such as the ability to set its own production schedule, buy and sell products in the external market, and negotiate transfer prices. These changes also make all three departments profit centers (rather than cost centers) because the managers of each department are responsible for both costs and revenues.

 b. I would recommend that upper management evaluate the three departments as profit centers because profits would be a good indicator of the performance of each department.

**22-18** (15 min.) **Benefits and costs of decentralization.**

1. Health Source has a centralized structure. Individual managers have little autonomy in decision making.

2. Harvest Moon has a decentralized structure. Store managers have significant autonomy. They are able to customize product offerings, negotiate purchases with local farmers, and can even influence store expansion decisions.

Benefits of a decentralized structure include: greater responsiveness to local needs and local opportunities, gains from faster decision making, increased motivation and personal commitment of store managers, and freedom of corporate managers to concentrate on strategic planning.

Costs of a decentralized structure include: potential for suboptimal decision making, shift of store managers’ focus away from company as a whole, increased cost of information gathering, and duplication of effort.

3. The stores in the Health Source chain would be considered profit centers. Store managers are responsible for store revenues and costs, and as such, would be evaluated based on operating income. Harvest Moon store managers would be considered investment center managers, as they also make, or at least influence, capital investment decisions. They would be evaluated based on return on investment or residual income.

4. Jackson must be attentive to the fact that Harvest Moon managers have enjoyed significant freedom to make decisions about their own stores. Jackson will need to carefully blend the two corporate cultures, and communicate to store managers that their input and efforts are valued. Bonuses and other rewards must be aligned with the corporation’s best interests. Specifically, Jackson should discourage price competition between stores and encourage cooperation among store managers. For example, store managers should be rewarded based on achieving both store-specific and corporate-wide profitability goals.

**22-19** (30 min.) **Transfer-pricing methods, goal congruence.**

1. *Alternative 1:* Sell as raw lumber for $200 per 100 board feet:

 Revenue $200

 Variable costs 100

 Contribution margin $100 per 100 board feet

 *Alternative 2:* Sell as finished lumber for $275 per 100 board feet:

 Revenue $275

 Variable costs:

 Raw lumber $100

 Finished lumber 125 225

 Contribution margin $ 50 per 100 board feet

British Columbia Lumber will maximize its total contribution margin by selling lumber in its raw form.

 An alternative approach is to examine the incremental revenues and incremental costs in the Finished Lumber Division:

 Incremental revenues, $275 – $200 $ 75

 Incremental costs 125

 Incremental loss $ (50) per 100 board feet

2. Transfer price at 110% of variable costs:

 = $100 + ($100 × 0.10)

 = $110 per 100 board feet

|  |  |  |
| --- | --- | --- |
|  | **Sell as** **Raw Lumber** | **Sell as** **Finished Lumber** |
| Raw Lumber DivisionDivision revenuesDivision variable costsDivision operating incomeFinished Lumber DivisionDivision revenuesTransferred-in costsDivision variable costsDivision operating income | $200 100$100$ 0 — $ 0 | $110100$ 10$275110 125$ 40 |

 The Raw Lumber Division will maximize reported division operating income by selling raw lumber, which is the action preferred by the company as a whole. The Finished Lumber Division will maximize division operating income by selling finished lumber, which is contrary to the action preferred by the company as a whole.

3. Transfer price at market price = $200 per 100 board feet.

|  |  |  |
| --- | --- | --- |
|  | **Sell as** **Raw Lumber** | **Sell as** **Finished Lumber** |
| Raw Lumber DivisionDivision revenuesDivision variable costsDivision operating incomeFinished Lumber DivisionDivision revenuesTransferred-in costsDivision variable costsDivision operating income | $200 100$100$ 0— — $ 0 | $200 100$100$275200 125$ (50) |

Because the Raw Lumber Division will be indifferent between selling the lumber in raw or finished form, it would be willing to maximize division operating income by selling raw lumber, which is the action preferred by the company as a whole. The Finished Lumber Division will maximize division operating income by not further processing raw lumber and this is preferred by the company as a whole. Thus, transfer at market price will result in division actions that are also in the best interest of the company as a whole.

**22-20** (35 min.) **Multinational transfer pricing, effect of alternative transfer-pricing methods, global income tax minimization.**

1. This is a three-country, three-division transfer-pricing problem with three alternative transfer-pricing methods. Summary data in U.S. dollars are as follows:

*China Plant*

 Variable costs: 900 Yuan ÷ 9 Yuan per $ = $100 per subunit

 Fixed costs: 1,980 Yuan ÷ 9 Yuan per $ = $220 per subunit

*South Korea Plant*

 Variable costs: 350,000 Won ÷ 1,000 Won per $ = $350 per unit

 Fixed costs: 470,000 Won ÷ 1,000 Won per $ = $470 per unit

*U.S. Plant*

 Variable costs: = $125 per unit

 Fixed costs: = $325 per unit

Market prices for private-label sale alternatives:

 China Plant: 4,500 Yuan ÷ 9 Yuan per $ = $500 per subunit

 South Korea Plant: 1,340,000 Won ÷ 1,000 Won per $ = $1,340 per unit

The transfer prices under each method are:

 a. Market price
 • China to South Korea = $500 per subunit

 • South Korea to U.S. Plant = $1,340 per unit

 b. 200% of full costs
 • China to South Korea
 2.0 × ($100 + $220) = $640 per subunit
 • South Korea to U.S. Plant
 2.0 × ($640 + $350 + $470) = $2,920 per unit

 c. 350% of variable costs

 • China to South Korea

 3.5 × $100 = $350 per subunit

 • South Korea to U.S. Plant

 3.5 × ($350 + $350) = $2,450 per unit

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Method A** | **Method B** | **Method C** |
|  | **Internal****Transfers****at Market****Price** | **Internal****Transfers****at 200% of****Full Costs** | **Internal****Transfers****at 350% of****Variable Costs** |
| 1. *China Division* Division revenue per unit Cost per unit: Division variable cost per unit Division fixed cost per unit Total division cost per unit Division operating income per unit Income tax at 40% Division net income per unit2. *South Korea Division* Division revenue per unit Cost per unit: Transferred-in cost per unit Division variable cost per unit Division fixed cost per unit Total division cost per unit Division operating income per unit Income tax at 20% Division net income per unit3. *United States Division* Division revenue per unit Cost per unit: Transferred-in cost per unit Division variable cost per unit Division fixed cost per unit Total division cost per unit Division operating income per unit Income tax at 30% Division net income per unit |  | $ 500100 220 320180 72$ 108$1,340500350 470 1,32020 4$ 16$3,8001,340 125 325 1,790 2,010 603$1,407 |  |  | $ 640 100 220 320 320 128$ 192$2,920640 350 470 1,460 1,460 292$1,168$3,800 2,920 125 325 3,370 430 129$ 301 |  |  | $ 350100 220 320 30 12$ 18$2,450350350 470 1,1701,280 256$1,024$3,8002,450125 325 2,900900 270$ 630 |  |

2. Division net income:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Market****Price** | **200% of****Full Costs** | **350% of****Variable Costs** |
| China DivisionSouth Korea DivisionU.S. DivisionTech Friendly Computer, Inc. | $ 108161,407$1,531 | $ 1921,168 301$1,661 | $ 181,024 630$1,672 |

Tech Friendly will maximize its net income by using the third method, 350% of variable costs, as the transfer price. This is because this method sources relatively little income in China, the country with the highest income tax rate.

**22-21** (30 min.) **Effect of alternative transfer-pricing methods on division operating income**.

|  |  |  |
| --- | --- | --- |
|  | **Method A****Internal Transfers at Market Prices** | **Method B****Internal Transfers at** **110% of Full Costs** |
| 1. *Mining Division*Revenues: $90, $661  200,000 units | $18,000,000 | $13,200,000 |
| Costs: Division variable costs: $522  200,000 units | 10,400,000 | 10,400,000 |
| Division fixed costs: $83  200,000 units |  1,600,000 |  1,600,000 |
|  Total division costs |  12,000,000 |  12,000,000 |
| Division operating income | $ 6,000,000 | $ 1,200,000 |
|  *Metals Division*Revenues: $150  200,000 units | $30,000,000 | $30,000,000 |
| Costs: Transferred-in costs: $90, $66  200,000 units | 18,000,000 | 13,200,000 |
| Division variable costs: $364  200,000 units | 7,200,000 | 7,200,000 |
| Division fixed costs: $155  200,000 units |  3,000,000 |  3,000,000 |
|  Total division costs |  28,200,000 |  23,400,000  |
| Division operating income | $ 1,800,000 | $ 6,600,000 |

1$66 = Full manufacturing cost per unit in the Mining Division, $60  110%

2Variable cost per unit in Mining Division = Direct materials + Direct manufacturing labor + 75% of manufacturing overhead = $12 + $16 + (75%  $32) = $52

3Fixed cost per unit = 25% of manufacturing overhead = 25% $32 = $8

4Variable cost per unit in Metals Division = Direct materials + Direct manufacturing labor + 40% of manufacturing overhead = $6 + $20 + (40%  $25) = $36

5Fixed cost per unit in Metals Division = 60% of manufacturing overhead = 60%  $25 = $15

2. Bonus paid to division managers at 1% of division operating income will be as follows:

|  |  |  |
| --- | --- | --- |
|  | **Method A****Internal Transfers at Market Prices** | **Method B****Internal Transfers at 110% of Full Costs** |
| Mining Division manager’s bonus (1% × $6,000,000; 1% × $1,200,000)  | $60,000 | $ 12,000 |
| Metals Division manager’s bonus (1% × $1,800,000; 1% ×$6,600,000) | 18,000 | 66,000 |

 The Mining Division manager will prefer Method A (transfer at market prices) because this method gives him $60,000 of bonus rather than $12,000 under Method B (transfers at 110% of full costs). The Metals Division manager will prefer Method B because this method provides $66,000 of bonus rather than $18,000 under Method A.

3. Brian Jones, the manager of the Mining Division, will appeal to the existence of a competitive market to price transfers at market prices. Using market prices for transfers in these conditions leads to goal congruence. Division managers acting in their own best interests make decisions that are also in the best interests of the company as a whole.

 Jones will further argue that setting transfer prices based on cost will cause him to pay no attention to controlling costs because all costs incurred will be recovered from the Metals Division at 110% of full costs.

**22-22** (30 min.) **Transfer pricing, general guideline, goal congruence.**

1. Using the general guideline presented in the chapter, the minimum price at which the Airbag Division would sell airbags to the Vivo Division is $90, the incremental costs. The Airbag Division has idle capacity (it is currently working at 80% of capacity). Therefore, its opportunity cost is zero—the Airbag Division does not forgo any external sales and, as a result, does not forgo any contribution margin from internal transfers. Transferring airbags at incremental cost achieves goal congruence.

2. Transferring products internally at incremental cost has the following properties:

a. Achieves goal congruence—Yes, as described in requirement 1 above.

b. Useful for evaluating division performance—No, because this transfer price does not cover or exceed full costs. By transferring at incremental costs and not covering fixed costs, the Airbag Division will show a loss. This loss, the result of the incremental cost-based transfer price, is not a good measure of the economic performance of the subunit.

c. Motivating management effort—Yes, if based on budgeted costs (actual costs can then be compared to budgeted costs). If, however, transfers are based on actual costs, Airbag Division management has little incentive to control costs.

d. Preserves division autonomy—No. Because it is rule-based, the Airbag Division has no say in the setting of the transfer price.

3. If the two divisions were to negotiate a transfer price, the range of possible transfer prices will be between $90 and $125 per unit. The Airbag Division has excess capacity that it can use to supply airbags to the Vivo Division. The Airbag Division will be willing to supply the airbags only if the transfer price equals or exceeds $90, its incremental costs of manufacturing the airbags. The Vivo Division will be willing to buy airbags from the Airbag Division only if the price does not exceed $125 per airbag, the price at which the Vivo division can buy airbags in the market from external suppliers. Within the price range of $90 and $125, each division will be willing to transact with the other and maximize overall income of Quest Motors. The exact transfer price between $90 and $125 will depend on the bargaining strengths of the two divisions. The negotiated transfer price has the following properties.

a. Achieves goal congruence—Yes, as described above.

b. Useful for evaluating division performance—Yes, because the transfer price is the result of direct negotiations between the two divisions. Of course, the transfer prices will be affected by the bargaining strengths of the two divisions.

c. Motivating management effort—Yes, because once negotiated, the transfer price is independent of actual costs of the Airbag Division. Airbag Division management has every incentive to manage efficiently to improve profits.

d. Preserves subunit autonomy—Yes, because the transfer price is based on direct negotiations between the two divisions and is not specified by headquarters on the basis of some rule (such as Airbag Division’s incremental costs).

4. Because the range of possible transfer prices is between $90 and $125 per unit, a “split the difference” hybrid solution would lead to a transfer price of ($90 + $125)/2 = $107.50.

* 1. (25 min.) **Multinational transfer pricing, global tax minimization.**

1. Solution Exhibit 22-23 shows the after-tax operating incomes earned by the U.S. and German divisions from transferring 100,000 broadband routers using (a) full manufacturing cost per unit, and (b) market price of comparable imports as transfer prices.

2. There are many ways to proceed, but the first thing to note is that the transfer price that minimizes the total of company import duties and income taxes will be either the full manufacturing cost or the market price of comparable imports.

 Consider what happens every time the transfer price is increased by $1 over, say, the full manufacturing cost of $400. This results in the following change for each unit:

a. an increase in U.S. taxes of 35%  $1 $0.35

b. an increase in import duties paid in Germany, 15%  $1 0.15

c. a decrease in German taxes of 40%  $1.15

 (the $1 increase in transfer price + $0.15 paid by way

 of import duty) (0.46)

 Net effect is an increase in import duty and tax payments of: $0.04

To verify this solution, note that if the transfer price changes from $400 to $475, the net effect is an increase in import duty and tax payments of ($475 – $400) × $0.04 = $3 per unit. Across 100,000 units, this implies a decrease in total profits of (100,000) × $3 = $300,000, which corresponds exactly to the $300,000 difference in total after-tax operating incomes documented in Solution Exhibit 22-23.

Therefore, Questron Company will minimize import duties and income taxes by setting the transfer price at its minimum level of $400, the full manufacturing cost.

**Solution Exhibit 22-23**

Division Incomes of U.S. and German Divisions from Transferring 100,000 broadband routers

|  |  |  |
| --- | --- | --- |
|  | **Method A****Internal Transfers** **at Full** **Manufacturing Cost** | **Method B****Internal Transfers at Market Price** |
| *U.S. Division*Revenues: $400, $475  100,000 unitsCosts: Full manufacturing cost: $400  100,000 unitsDivision operating incomeDivision income taxes at 35%Division after-tax operating income*German Division*Revenues: $575  100,000 unitsCosts: Transferred-in costs: $400  100,000, $475  100,000 units Import duties at 15% of transferred-in price $60  100,000, $71.25  100,000 units Total division costsDivision operating incomeDivision income taxes at 40%Division after-tax operating income | $40,000,000 40,000,0000 0$ 0$57,500,00040,000,000 6,000,000 46,000,000 11,500,000 4,600,000$ 6,900,000 | $47,500,000 40,000,0007,500,000 2,625,000$ 4,875,000$57,500,00047,500,000 7,125,000 54,625,000 2,875,000 1,150,000$ 1,725,000 |

Sum of divisional after-tax operating incomes $ 6,900,000 $ 6,600,000

**22-24** (30 min.) **Multinational transfer pricing, goal congruence (continuation of 22-23).**

1. After-tax operating income if Questron Company sells all 100,000 broadband routers in the United States:

Revenues, $450 100,000 units $45,000,000

Full manufacturing costs, $400  100,000 units 40,000,000

Operating income 5,000,000

Income taxes at 35% 1,750,000

After-tax operating income $ 3,250,000

 From Exercise 22-23, requirement 1, Questron Company’s after-tax operating income if it transfers 100,000 broadband routers to Germany at full manufacturing cost and sells the units in Germany is $6,900,000. Therefore, Questron should sell the 100,000 units in Germany.

2. Transferring broadband routers at the full manufacturing cost of the U.S. Division minimizes import duties and taxes (Exercise 22-23, requirement 2) but creates zero operating income for the U.S Division. Acting autonomously, the U.S. Division manager would maximize division operating income by selling routers in the U.S. market, which results in $3,250,000 in after-tax division operating income as calculated in requirement 1, rather than by transferring routers to the German division at full manufacturing cost. Thus, the transfer price calculated in requirement 2 of Exercise 22-23 will not result in actions that are optimal for Questron Company as a whole.

3. The minimum transfer price at which the U.S. Division manager acting autonomously will agree to transfer broadband routers to the German Division is $450 per unit. Any transfer price less than $450 will leave the U.S. Division’s performance worse than if it were to sell directly in the U.S. market. Because the U.S. Division can sell as many routers as it makes in the U.S. market, there is an opportunity cost of transferring the product internally equal to $175 (selling price $450 − variable manufacturing costs, $275).

  = 

 = $275 + $175 = $450

 This transfer price will result in Questron Company as a whole paying more import duties and taxes than the answer to Exercise 22-23, requirement 2, as calculated below:

*U.S. Division*

Revenues, $450  100,000 units $45,000,000

Full manufacturing costs 40,000,000

Division operating income 5,000,000

Division income taxes at 35% 1,750,000

Division after-tax operating income $ 3,250,000

 *German Division*

Revenues, $575  100,000 units $57,500,000

Transferred in costs, $450  100,000 units 45,000,000

Import duties at 15% of transferred-in price,

 $67.50  100,000 units 6,750,000

Division operating income 5,750,000

Division income taxes at 40% 2,300,000

Division after-tax operating income $ 3,450,000

Total import duties and income taxes at transfer prices of $400 and $450 per unit for 100,000 broadband routers are given below:

|  |  |  |
| --- | --- | --- |
|  | **Transfer Price of****$400 per Unit****(Exercise 22-23,****Requirement 2)** | **Transfer Price of****$450 per Unit** |
| (a) U.S. income taxes(b) German import duties(c) German income taxes | $ 06,000,000 4,600,000$10,600,000 | $ 1,750,0006,750,000 2,300,000$10,800,000 |

 The minimum transfer price that the U.S. Division manager, acting autonomously, would agree to results in Questron Company paying $200,000 in additional import duties and income taxes.

 A student who has done the calculations shown in Exercise 22-23, requirement 2, can calculate the additional taxes from a $450 transfer price more directly, as follows:

 Every $1 increase in the transfer price per unit over $400 results in additional import duty and taxes of $0.04 per unit, so a $50 increase ($450 – $400) per unit will result in additional import duty and taxes of $0.04  50 = $2.00. For 100,000 units transferred, this equals $2.00  100,000 = $200,000.

**22-25** (20 min.) **Transfer-pricing dispute.**

This problem is similar to the Problem for Self-Study in the chapter.

1. Company as a whole will not benefit if Division C purchases from external suppliers:

 Purchase costs paid to external suppliers, 1,900 units  $115 $218,500

 Deduct: Savings in variable costs by reducing

 Division A output, 1,900 units  $105 199,500

 Net cost (benefit) to company as a whole as a result of

 purchasing from external suppliers $ 19,000

 Any transfer price between $105 and $115 per unit will achieve goal congruence. Division managers acting in their own best interests will take actions that are in the best interests of the company as a whole.

2. Company as a whole will benefit if Division C purchases from external suppliers:

 Purchase costs paid to external suppliers, 1,900 units  $115 $218,500

 Deduct: Savings in variable costs,

 1,900 units  $105 $199,500

 Savings due to A’s equipment and

 facilities assigned to other operations 22,800 222,300

 Net cost (benefit) to company as a whole as a result of

 purchasing from external suppliers $ (3,800)

Division C should not purchase from external suppliers.

3. Company as a whole will benefit if Division C purchases from external suppliers:

 Purchase costs paid to external suppliers, 1,900 units  $100 $190,000

 Deduct: Savings in variable costs by reducing

 Division A output, 1,900 units  $105 199,500

 Net cost (benefit) to company as a whole as a result of

 purchasing from external suppliers $ (9,500)

The three requirements are summarized below (per unit, for 1,900 units):

|  |  |  |  |
| --- | --- | --- | --- |
|  | **(1)** | **(2)** | **(3)** |
| Purchase costs paid to external suppliersRelevant costs if purchased from Division A: Incremental (outlay) costs if purchased from Division A Opportunity costs if purchased from Division ATotal relevant costs if purchased from Division AOperating income advantage (disadvantage) to company as a result of purchasing from Division A | $115105 –  105$ 10 | $115105 12 117$ (2) | $100105 –  105$ (5) |

Goal congruence would be achieved if the transfer price is set equal to the total relevant costs of purchasing from Division A.

**22-26** (5 min.) **Transfer-pricing problem (continuation of 22-25).**

The company as a whole would benefit in this situation if Division C purchased from external suppliers. The $19,000 disadvantage to the company as a whole as a result of purchasing from external suppliers would be more than offset by the $57,000 contribution margin of Division A’s sale of 1,900 units to other customers:

 Purchase costs paid to external suppliers, 1,900 units  $115 $218,500

 Deduct variable cost savings, 1,900 units  $105 199,500

 Net cost to the company as a result of purchasing from external suppliers $ 19,000

 Division A’s sales to other customers, 1,900 units  $137 $260,300

 Deduct:

 Variable manufacturing costs, $105  1,900 units $199,500

 Variable marketing costs, $2  1,900 units 3,800

 Total variable costs 203,300

 Contribution margin from selling units to other customers $ 57,000

**22-27** (20 min.) **General guideline, transfer pricing.**

1. The minimum transfer price that the SD would demand from the AD is the net price it could obtain from selling its screens on the outside market: $100 minus $8 marketing and distribution cost per screen, or $92 per screen. The SD is operating at capacity. The incremental cost of manufacturing each screen is $65. Therefore, the opportunity cost of selling a screen to the AD is the contribution margin the SD would forgo by transferring the screen internally instead of selling it on the outside market.

 Contribution margin per screen = $92 – $65 = $27

Using the general guideline,

  =  + 

 = $65 + $27 = $92

2. The maximum transfer price the AD manager would be willing to offer SD is its own total cost for purchasing from outside, $100 plus $7 per screen, or $107 per screen.

3a. If the SD has excess capacity (relative to what the outside market can absorb), the minimum transfer price using the general guideline is as follows: for the first 6,000 units (or 30% of output), $65 per screen because opportunity cost is zero; for the remaining 14,000 units (or 70% of output), $92 per screen because opportunity cost is $27 per screen.

3b. From the point of view of Slate’s management, all of the SD’s output should be transferred to the AD. This would avoid the $7 per screen variable purchasing cost that is incurred by the AD when it purchases screens from the outside market, and it would also save the $8 marketing and distribution cost the SD would incur to sell each screen to the outside market.

3c. If the managers of the AD and the SD could negotiate the transfer price, they would settle on a price between the minimum transfer price the SD will accept (from requirement 3a) and $107 per screen (the maximum transfer price the AD would be willing to pay). Any price in this range would be acceptable to both divisions for all of the SD’s output and would also be optimal from Slate’s point of view. This would obviously apply to the “split the difference” price as well. When the SD has excess capacity, this rule would suggest a price of ($65 + $107)/2 = $86; for the other 70% of output that SD can sell externally, the rule indicates a price of ($92 + $107)/2 = $99.5. From a practical standpoint, note that the latter price also works when SD has excess capacity; as a result, the firm might prefer it as a stable benchmark price, keeping in mind of course that it credits SD with too high a profit even at times of unused capacity.

**22-28** (20–30 min.) **Pertinent transfer price, perfect and imperfect markets.**

This problem explores the “general transfer-pricing guideline” discussed in the chapter.

1. No, transfers should not be made to Division B if there is no unused capacity in Division A. An incremental (outlay) cost approach shows a positive contribution for the company as a whole:

 Selling price of final product $360

 Incremental cost per unit in Division A $ 90

 Incremental cost per unit in Division B 120 210

 Contribution margin per unit $ 150

 However, if there is no excess capacity in Division A, any transfer will result in diverting products from the market for the intermediate product. Sales in this market result in a greater contribution for the company as a whole. Division B should not assemble the bicycle because the incremental revenue Wheely can earn, $85 per unit ($360 from selling the final product – $275 from selling the intermediate product) is less than the incremental cost of $120 to assemble the bicycle in Division B. Alternatively, Wheely’s contribution margin from selling the intermediate product exceeds Wheely’s contribution margin from selling the final product:

 Selling price of intermediate product $275

 Incremental (outlay) cost per unit in Division A 90

 Contribution margin per unit $ 185

Using the general guideline described in the chapter,

 =  + 

 = $90 + ($275 – $90)

 = $275, which is the market price

 The market price is the transfer price that leads to the correct decision; that is, do not transfer to Division B unless there are extenuating circumstances for continuing to market the final product. Therefore, Division B must either drop the product or reduce the incremental costs of assembly from $120 per bicycle to less than $85 (selling price, $360 – transfer price, $275).

2. If (a) A has excess capacity, (b) there is intermediate external demand for only 900 units at $275, and (c) the $275 price is to be maintained, then the opportunity costs per unit to the supplying division are $0. The general guideline indicates a minimum transfer price of $90 + $0 = $90, which is the incremental or outlay costs for the first 300 units. B would buy 300 units from A at a transfer price of $90 because B can earn a contribution of $150 per unit [$360 –
($90 + $120)]. In fact, B would be willing to buy units from A at any price up to $240 per unit because any transfers at a price lower than $240 will still yield B a positive contribution margin.

 Note, however, that if B wants more than 300 units, the minimum transfer price will be $275 as computed in requirement 1 because A will incur an opportunity cost in the form of lost contribution of $185 (market price, $275 – outlay costs of $90) for every unit above 300 units that are transferred to B.

 The following schedule summarizes the transfer prices for units transferred from A to B:

 **Units Transfer Price**

 0–300 $90–$240

 300–1,200 $275

For an exploration of this situation when imperfect markets exist, see the next problem.

3. Division B would show zero contribution, but the company as a whole would generate a contribution of $150 per unit on the 300 units transferred. Any price between $90 and $240 would induce the transfer that would be desirable for the company as a whole. A motivational problem may arise regarding how to split the $150 contribution between Division A and B. Unless the price is below $240, B would have little incentive to buy.

*Note*: The transfer price that may appear optimal in an economic analysis may, in fact, be totally unacceptable from the viewpoints of (1) preserving autonomy of the managers, and (2) evaluating the performance of the divisions as economic units. For instance, consider the simplest case discussed previously, where there is idle capacity and the $275 intermediate price is to be maintained. To direct that A should sell to B at A’s variable cost of $90 may be desirable from the viewpoint of B and the company as a whole. However, the autonomy (independence) of the manager of A is eroded. Division A will earn nothing, although it could argue that it is contributing to the earning of income on the final product.

 If the manager of A wants a portion of the total company contribution of $150 per unit, the question is: How is an appropriate amount determined? This is a difficult question in practice. The price can be negotiated upward to somewhere between $90 and $240 so that some “equitable” split is achieved. A dual transfer-pricing scheme has also been suggested, whereby the supplier gets credit for the full intermediate market price and the buyer is charged with only
variable or incremental costs. In any event, when there is heavy interdependence between divisions, such as in this case, some system of subsidies may be needed to deal with the three problems of goal congruence, management effort, and subunit autonomy. Of course, where heavy subsidies are needed, a question can be raised as to whether the existing degree of decentralization is optimal.

4. Potential contribution from external intermediate sale is

 1,200 × ($270 – $90) $216,000

 Contribution through keeping price at $275 is

 900 × $185. 166,500

 Forgone contribution by transferring 300 units $ 49,500

 Opportunity cost per unit to the supplying division by transferring internally:

  **=** $165

 Transfer price = $90 + $165 = $255

An alternative approach to obtaining the same answer is to recognize that the incremental or outlay cost is the same for all 1,200 units in question. Therefore, the total revenue desired by A would be the same for selling outside or inside.

 Let X equal the transfer price at which Division A is indifferent between selling all units outside versus transferring 300 units inside.

 1,200 × $270 = (900 × $275) + 300X

 X = $255

 The $255 price will lead to the correct decision. Division B will not buy from Division A because its total costs of $255 + $120 will exceed its prospective selling price of $360. Division A will then sell 1,200 units at $270 to the outside; Division A and the company will have a contribution margin of $216,000. Otherwise, if 900 units were sold at $275 and 300 units were transferred to Division B, the company would have a contribution of $166,500 plus $45,000 (300 units of final product × $150), or $211,500.

 A comparison might be drawn regarding the computation of the appropriate transfer prices between the preceding problem and this problem:

 = + 

 Perfect markets: = $90 + (Selling price – Outlay costs per unit)

 = $90 + ($275 – $90) = $275

 Imperfect markets: = $90 +

 = $90 + **=** $255

aMarginal revenues of Division A from selling 300 units outside rather than transferring to Division B

 = ($270  1,200) – ($275  900) = $324,000 – $247,500 = $76,500.

bIncremental (outlay) costs incurred by Division A to produce 300 units

 = $90  300 = $27,000.

 Therefore, selling price ($270) and marginal revenues per unit ($255 = $76,500 ÷ 300) are not the same.

 The following discussion is optional. These points should be explored only if there is sufficient class time.

 Some students may erroneously say that the “new” market price of $270 is the appropriate transfer price. They may claim that the general guideline says that the transfer price should be $90 + ($270 – $90) = $270, the market price. This conclusion assumes a perfect market. However, in this case, there are imperfections in the intermediate market. That is, the market price is *not* a good approximation of alternative revenue. If a division’s sales are heavy enough to reduce market prices, marginal revenue will be less than market price.

 It is true that *either* $270 or $255 will lead to the correct decision by B in this case. But suppose that B’s variable costs were $90 instead of $120. Then B would buy at a transfer price of $255 (but not at a price of $270, because then B would earn no contribution per unit [$360 – ($270 + $90)]. Note that if B’s variable costs were $90, transfers would be desirable:

 Division A contribution is:

 [900 × ($275 – $90)] + [300 × ($255 – $90)] $216,000

 Division B contribution is:

 300 × [$360 – ($255 + $90)] 4,500

 Total contribution $220,500

Or the same facts can be analyzed for the company as a whole:

 Sales of intermediate product,

 900 × ($275 – $90) = $166,500

 Sales of final products,

 300 × [360 – ($90 + $90)] = 54,000

 Total contribution $220,500

If the transfer price were $275, B would not accept the transfer and would not earn any contribution. As shown above, Division A and the company as a whole will earn a total contribution of $216,000 instead of $220,500.

ALTERNATIVE PRESENTATION (by James Patell)

Company Viewpoint

a: *Sell 1,200 units outside at $270 per unit* b: *Sell 900 units outside at $275 per unit, transfer 300*

Price $270 Price $275

Variable cost per unit 90 Variable cost per unit 90

Contribution $ 180 × 1,200 = $216,000 Contribution $ 185 × 900 = $166,500

Total contribution given up if transfer occurs

 = $216,000 – $166,500 = $49,500

On a per-unit basis, the relevant costs are:

  +  = Transfer price

 $90 +  =$255

By formula, costs are:

**** + [lost opportunity to sell 300 units at $270 per unit, for contribution of $185 per unit] **–** [gain when 1st 900 units sell at $275 per unit instead of $270 per unit]

 = $90 +  **– **

 **=** $90 + $180 – $15 = $255

22-29 (30–35 min.) Effect of alternative transfer-pricing methods on division operating income.

1.

|  |  |  |
| --- | --- | --- |
| Pounds of cranberries harvested |   | 420,000  |
| Gallons of juice processed (500 gals per 1,000 lbs.) |   |  210,000 |
| Revenues (210,000 gals.  $2.15 per gal.) |  | $451,500 |
| Costs  |  |   |
|  Harvesting Division |  |  |
|  Variable costs (420,000 lbs.  $0.14 per lb.) | $ 58,800 |   |
|  Fixed costs (420,000 lbs.  $0.26 per lb.) | 109,200 |   |
|  Total Harvesting Division costs |  | 168,000 |
|  Processing Division |  |  |
|  Variable costs (210,000 gals.  $0.32 per gal.) | $ 67,200 |   |
|  Fixed costs (210,000 gals.  $0.50 per gal.) | 105,000 |   |
|  Total Processing Division costs |  |  172,200 |
|  Total costs |  |  340,200 |
| Operating income |  | $111,300 |
|  |  |  |

2.

|  |  |  |
| --- | --- | --- |
|   | **150% of** **Full Costs** | **Market Price** |
| Transfer price per pound [($0.14 + $0.26)  1.5; $0.58] | $0.60  | $0.58  |
|   |  |   |
| **1. Harvesting Division** |  |   |
| Revenues (420,000 lbs.  $0.60; $0.58) | $252,000 | $243,600 |
| Costs |  |  |
|  Division variable costs (420,000 lbs. $0.14 per lb.) | 58,800 | 58,800 |
|  Division fixed costs (420,000 lbs.  $0.26 per lb.) |  109,200 |  109,200 |
|  Total division costs |  168,000 |  168,000 |
| Division operating income | $84,000 | $75,600 |
| Harvesting Division manager's bonus (3% of operating income) | $2,520 | $2,268 |
|   |  |   |
| **2. Processing Division** |  |   |
| Revenues (210,000 gals.  $2.15 per gal.) | $451,500 | $451,500 |
| Costs |  |  |
|  Transferred-in costs  | 252,000 | 243,600 |
|  Division variable costs (210,000 gals.  $0.32 per gal.) | 67,200 | 67,200 |
|  Division fixed costs (210,000 gals.  $0.50 per gal.) |  105,000 |  105,000 |
|  Total division costs |  424,200 |  415,800 |
| Division operating income | $ 27,300 | $ 35,700 |
| Processing Division manager’s bonus (3% of operating income) | $819 | $1,071 |

3. Bonus paid to division managers at 3% of division operating income is computed above and summarized below:

|  |  |  |
| --- | --- | --- |
|  | **Internal Transfers****at 150% of Full Costs** | **Internal Transfers****at Market Prices** |
| Harvesting Division manager’s bonus |  |  |
| (3% × $84,000; 3% × $75,600) | $2,520 | $2,268 |
|  |  |  |
| Processing Division manager’s bonus |  |  |
| (3% × $27,300; 3% × $35,700) | $819 | $1,071 |

######  The Harvesting Division manager will prefer to transfer at 150% of full costs because this method gives a higher bonus. The Processing Division manager will prefer transfer at market price for its higher resulting bonus.

###### Cranergy may resolve or reduce transfer pricing conflicts by the following:

###### Base division managers’ bonuses on overall Cranergy profits in addition to division operating income. This will motivate each manager to consider what is best for Cranergy overall and not be concerned with the transfer price alone.

* Let the two divisions negotiate the transfer price between themselves. However, this may result in constant renegotiation between the two managers each accounting period.
* Use dual transfer prices. However, a cost-based transfer price will not motivate cost control by the Harvesting Division manager. It will also insulate that division from the discipline of market prices.

22-30 (25 min.) Goal congruence problems with cost-plus transfer-pricing methods, dual pricing system (continuation of 22-29).

1. Two examples of goal congruence problems that arise if a transfer price of 150% of full costs is mandated and Borges’ decentralization policy is adopted are as follows:

1. The Processing Division manager will prefer to buy cranberries from an external supplier at $0.58 per pound, incurring some extra purchasing costs and lowering Cranergy’s overall operating income. Cranergy will incur costs of $0.58 per pound and save variable costs of only $0.14 per pound.
2. The Harvesting Division manager is forced to sell to an outside purchaser (because the Processing Division prefers to purchase from an external supplier) when it is better for Cranergy Products to process internally.

2.*Transfer into buying division at market price*

###### Harvesting Division to Processing Division = $0.58 per pound of cranberries

 *Transfer out of selling division at 150% of full costs*

###### Harvesting Division to Processing Division = 1.5 × ($0.14 + $0.26) = $0.60 per pound of cranberries

As calculated in Requirement 2 of 22-29 and also shown on the following page, under the dual transfer-pricing policy, the Harvesting Division will earn an operating income of $84,000 and the Processing Division will earn an operating income of $35,700.

|  |  |  |
| --- | --- | --- |
|   | **150% of Full Costs** | **Market Price** |
| **Harvesting Division** |  |  |
| Revenues (420,000 lbs.  $0.60 per lb.) | $252,000 |  |
| Costs |  |  |
|  Division variable costs (420,000 lbs.  $0.14 per lb.) | 58,800 |  |
|  Division fixed costs (420,000 lbs.  $0.26 per lb.) |  109,200 |  |
|  Total division costs |  168,000 |  |
| Division operating income | $84,000 |  |
|   |  |  |
| **Processing Division** |  |   |
| Revenues (210,000 gals.  $2.15 per gal.) |  | $451,500 |
| Costs |  |  |
|  Transferred in costs (420,000 lbs.  $0.58 per lb.) |  | 243,600 |
|  Division variable costs (420,000 gals.  $0.32 per gal.) |  | 67,200 |
|  Division fixed costs (210,000 gals.  $0.50 per gal.) |  |  105,000 |
|  Total division costs |  |  415,800 |
| Division operating income |  | $ 35,700 |
|  |  |  |

3. Under the dual transfer pricing policy,

 **Division Operating Income**

####  Harvesting Division $84,000

 Processing Division 35,700

 Cranergy Products $119,700

The overall company operating income from harvesting and processing 420,000 pounds of cranberries is $111,300 (see Problem 22-29, requirement 1).

 A dual transfer-pricing method entails using different transfer prices for transfers into the buying division and transfers out of the supplying division. As a result, the sum of division operating incomes does not equal the total company operating income.

4.Problems which may arise if Cranergy Products uses the dual transfer-pricing system include:

1. It may reduce the incentives of the supplying division to control costs because every $1 of cost of the supplying division is transferred out to the buying division at $1.50.
2. A dual transfer-pricing system does not provide clear signals to the individual divisions about the level of decentralization top management seeks.
3. It insulates the Harvesting Division manager from the frictions and the discipline of the marketplace because costs, not market prices, affect the revenues of the supplying division.

**22-31** (40 min.) **Multinational transfer pricing, global tax minimization.**

This is a two-country two-division transfer-pricing problem with two alternative transfer-pricing methods.

Summary data in U.S. dollars are:

*North Italy Mining Division*

 Variable costs: 72 EURO ÷ 0.8 = $ 90 per ton of raw potash

 Fixed costs: 112 EURO ÷ 0.8 = $140 per ton of raw potash

 Market price: 296 EURO ÷ 0.8 = $370 per ton of raw potash

*U.S. Processing Division*

 Variable costs = $ 48 per ton of fertilizer

 Fixed costs = $ 120 per ton of fertilizer

 Market price = $1,150 per ton of fertilizer

1. The transfer prices are:

a. *150% of full costs*

 Mining Division to Processing Division

 = 1.5 × ($90 + $140) = $345 per ton of raw potash

b. *Market price*

 Mining Division to Processing Division

 = $370 per ton of raw potash

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **150% of****Full Cost** | **Market****Price** |
|  | *North Italy Mining Division*Division revenues, $345, $370  12,000Costs Division variable costs, $90 12,000 Division fixed costs, $140  12,000 Total division costsDivision operating income*U.S. Processing Division*Division revenues, $1,150  6,000Costs Transferred-in costs, $345, $370  12,000 Division variable cost, $48 6,000 Division fixed costs, $120  6,000 Total division costsDivision operating income | $4,140,0001,080,000 1,680,000 2,760,000$1,380,000$6,900,0004,140,000288,000 720,000 5,148,000$1,752,000 | $4,440,0001,080,000 1,680,000 2,760,000$1,680,000$6,900,0004,440,000288,000 720,000 5,448,000$1,452,000 |

|  |  |  |  |
| --- | --- | --- | --- |
| 2. |  | **150% of****Full Cost** | **Market****Price** |
|  | *North Italy Mining Division*Division operating incomeIncome tax at 30%Division after-tax operating income | $1,380,000 414,000$ 966,000 | $1,680,000 504,000$1,176,000 |
|  | *U.S. Processing Division*Division operating incomeIncome tax at 35%Division after-tax operating income | $1,752,000 613,200$1,138,800 | $1,452,000 508,200$ 943,800 |
|  |  |  |  |
|  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 3. |  | **150% of****Full Cost** | **Market****Price** |
|  | *North Italy Mining Division:* After-tax operating income*U.S. Processing Division:* After-tax operating income*Supergrow*: After-tax operating income | $ 966,000 1,138,800$2,104,800 | $1,176,000 943,800$2,119,800 |

The North Italy Mining Division manager will prefer the higher transfer price of market price, and the U.S. Processing Division manager will prefer the lower transfer price equal to 150% of full cost. Supergrow will maximize companywide net income by using the market price-based transfer-pricing method. This method sources more of the total income in Italy, the country with the lower income tax rate.

4. Factors that executives consider important in transfer pricing decisions include the following:

a. Performance evaluation

b. Management motivation

c. Pricing and product emphasis

d. External market recognition

Factors specifically related to multinational transfer pricing include the following:

a. Overall income of the company

b. Income or dividend repatriation restrictions

c. Competitive position of subsidiaries in their respective markets

**22-32** (30–40 min.) **Transfer pricing, external market, goal congruence.**

1. The UP division’s current level of profit is as follows:

Sales to external customers: 10,000 × $16 = $160,000

Sales to DOWN division: 20,000 × $16 = 320,000

 Sales Revenues: 480,000

Variable manufacturing costs: 30,000 × $ 9 = 270,000

Fixed manufacturing costs: 60,000

 Operating Income: $150,000

2. With the new order, the UP division generates additional contribution margin from the 4,000 units it sells to Jean Georges (note that fixed costs are irrelevant because of the presence of excess capacity). At a price of $12.50, the incremental contribution from the order is:

4,000 units × ($12.50 – $9) = $14,000

However, the weighted average external price is no longer $16, but rather

 = $15.

As a result, the transfer price realized by UP for internal sales is lowered from $16 to $15, reducing UP’s sales revenues by (20,000 units) × $1 = $20,000.

The net effect therefore is that UP’s operating income would *decrease* by $6,000 ($20,000 – $14,000) overall. As manager of the UP division, Kathleen Bono would therefore choose to *reject* the offer from Jean Georges.

3. Yes, because the new order from Jean Georges results in an additional contribution margin to Baldenius of $14,000, and the same amount in higher firm-wide profit. The additional effect identified in requirement 2, namely the effect on the internal transfer price, has no relevance in evaluating the value of the order to the firm as a whole.

4. Let *d* be the percentage discount from the weighted average market price that is used to set the internal transfer price. To eliminate the goal incongruence identified in requirements 1 and 2, we have to solve for the value of *d* at which the UP division makes the same profit both with and without the new order from Jean Georges. Note that we can ignore the sales revenues from external customers, the variable manufacturing costs for the initial 30,000 units and the fixed manufacturing costs as none of these amounts are affected by the new external order or the transfer price. The rest of UP division’s profits are given by:

Without order: 20,000 units × $16 × (1 – *d*)

With order: 20,000 units × $15 × (1 – *d*) + $14,000

Setting these quantities equal, we see that:

1 – *d* =  = 0.70, or *d* = 0.30.

So, by setting the transfer price at a 30% discount from the weighted average price of external sales, the manager of the UP division, Kathleen Bono, will have the right incentives to take the outside offer that is in the firm’s best interest. Of course, any discount greater than 30% will provide Kathleen even greater motivation to accept the offer from Jean Georges.

**22-33** (30–40 min.) **International transfer pricing, taxes, goal congruence.**

1. The minimum transfer price would be $64 to cover the variable production ($56 per unit) and shipping ($8 per unit) costs because Pollux would want, at a minimum, zero contribution margin. The opportunity cost is $0 because there are no external customers for IP-2014. The maximum transfer price would be the $77 market price that Castor would have to pay to acquire a product similar to IP-2014 from the external market in the United States.

2. To minimize income taxes, Gemini should use a transfer price of $64. Canada has a higher tax rate so goods coming from Canada should have the lowest transfer price. Pollux would not like a transfer price of $64 because it would report no operating income from the transfer. Castor would like a transfer price of $64 because it is lower than the outside market price of $77.

3a. It is easiest to see the solution to this problem if we assume a selling price for the product that Castor manufactures, for example, $120. (The actual selling price you choose is irrelevant.)

 Pollux’s after-tax income on each unit from accepting the special order is as follows:

|  |  |
| --- | --- |
| Revenue per unit | $62.00 |
| Variable cost per unit |  56.00 |
| Contribution margin per unit | 6.00 |
| Income taxes (0.40 × $6) |  2.40 |
| Increase in division income per unit after tax | $ 3.60 |

 Castor’s after-tax income on each unit if Pollux accepts the special order and Castor buys the substitute product for IP-2014 in the United States for $77 per unit is as follows:

|  |  |
| --- | --- |
| Revenue per unit | $120.00 |
| Variable cost per unit |  77.00 |
| Contribution margin per unit | 43.00 |
| Income taxes (0.30 × $43) |  12.90 |
| Increase in division income per unit after tax | $ 30.10 |

 Gemini’s total net income on each unit from Pollux accepting the special order is therefore $3.60 + $30.10 = $33.70.

 If Pollux rejects the special order and instead transfers the units internally to Castor at $64 per unit, Pollux’s after-tax income would be as follows:

|  |  |
| --- | --- |
| Revenue per unit | $64 |
| Variable cost per unit |  64 |
| Contribution margin per unit | 0 |
| Income taxes  |  0 |
| Increase in division income per unit after tax | $ 0 |

 Castor’s after-tax income on each unit is as follows:

|  |  |
| --- | --- |
| Revenue per unit | $120.00 |
| Variable cost per unit |  64.00  |
| Contribution margin per unit | 56.00 |
| Income taxes (0.30 × $56) |  16.80 |
| Increase in division income per unit after tax | $ 39.20 |

 Gemini’s total net income on each unit as a result of Pollux rejecting the special order and transferring units of IP-2014 to Castor at $64 per unit is therefore $39.20 per unit. As this is higher than $33.70, accepting the special order does not maximize after-tax operating income. After-tax operating income is maximized by rejecting the special order.

3b. Castor will not want Pollux to accept the special order. It is more costly to buy from the external market than from Pollux.

3c. Pollux will want to accept the special order because Pollux’s income per unit after-tax increases by $3.60 per unit by accepting the special order rather than transferring IP-2014 to Castor at $64 per unit and earning $0 operating income.

3d. Gemini should set the transfer price at $70 per unit. This will result in each division taking actions in its own best interest that are also in the best interest of Gemini as a whole acting as a decentralized organization.

 The opportunity cost of transferring IP-2014 internally is $6 ($62 ─ $56) per unit for the first 8,000 units and $0 per unit thereafter.

Using the general guideline,

  =  + 

  = $64 + $6 = $70 per unit for the first 8,000 units

 $64 + $0 = $64 per unit for the next 7,000 units

Gemini should use these minimum transfer prices because they are also (reasonably) tax-efficient.

 At a transfer price of $70 per unit for the first 8,000 units, Pollux is indifferent between accepting the special order or transferring internally. Pollux earns $6 per unit if it accepts the special order. It also earns $6 per unit if it transfers IP-2014 to Castor ($70 - $64 variable cost per unit).

 Castor will prefer to “buy” IP-2014 from Pollux because the transfer price of $70 is less than the $77 price it would pay to buy a product similar to IP-2014 in the United States.

The increase in Gemini’s income will be as follows:

|  |  |
| --- | --- |
| From Pollux: |  |
| Revenue per unit | $70.00 |
| Variable cost per unit |  64.00 |
| Contribution margin per unit | 6.00 |
| Income taxes (0.40 × $6) |  2.40 |
| Increase in division income per unit after tax | $ 3.60 |
|  |  |
| From Castor: |  |
| Revenue per unit | $120.00 |
| Transfer price per unit |  70.00 |
| Contribution margin per unit | 50.00 |
| Income taxes (0.30 × $50) |  15.00 |
| Increase in division income per unit after tax | $ 35.00 |

Increase in Gemini’s income = $3.60 + $35.00 = $38.60

 This net income is greater than the $33.70 net income that Gemini would earn if Pollux accepted the special order. It is less than the $39.20 that Gemini would earn if Pollux had transferred IP-2014 at $64 per unit. Of course, if the transfer price is set at $64 per unit, Pollux would accept the special order, which would lead to a lower net income of $33.70. If Gemini wants to get the benefits of decentralization, it must be willing to suffer the consequences of higher taxes that Pollux would have to pay.

 Note that Gemini would not want to set the transfer price any higher than $70, the minimum transfer price that would induce Pollux to transfer internally to Castor. Why? Because setting the transfer price any higher would result in exactly the same action (transferring IP-2014 internally) but at a higher cost because of the higher taxes that Pollux would have to pay in Canada. Consider for example a transfer price of $75 per unit. The increase in Gemini’s income will be as follows:

|  |  |
| --- | --- |
| From Pollux: |  |
| Revenue per unit | $75.00 |
| Variable cost per unit |  64.00 |
| Contribution margin per unit |  11.00 |
| Income taxes (0.4 × $11) |  4.40 |
| Increase in division income per unit after tax | $ 6.60 |
|  |  |
| From Castor: |  |
| Revenue per unit | $120.00 |
| Transfer price per unit |  75.00 |
| Contribution margin per unit |  45.00 |
| Income taxes (0.30 × $45) |  13.50 |
| Increase in division income per unit after tax | $ 31.50 |

Increase in Gemini’s income is $6.60 + $31.50 = $38.10, which is less than the $38.60 Gemini earns if the transfer price is set at $70 per unit. A transfer price of $70 is the most tax-efficient transfer price consistent with Gemini operating as a decentralized organization. Note also that the transfer price cannot be set above $77 per unit because then Castor would buy a product similar to IP-2014 in the United States rather than from Pollux.

**22-34** (20 min.) **Transfer pricing, goal congruence, ethics.**

1. The transfer price is 110% of the full cost per unit:

 1.10 [($0.075 × 100) + $6.35 + $2.15] = $17.60

Because $17.00 is below the transfer price of $17.60, the manufacturing division manager would choose to purchase the 2,000 rolls from Ecofree.

2. The purchase is not in the best interest of Sustainable Industries because, if produced internally, the additional 2,000 rolls would only cost the company $27,700 ($13.85 of variable cost per unit × 2,000 rolls). Because there is available capacity, fixed costs would be unaffected. If purchased from Ecofree, the paper would cost $34,000. The cause of this goal incongruence is two-fold: setting a transfer price based on full cost treats fixed costs as variable, and setting the price above full cost (in this case 110%) artificially inflates the cost to the purchasing division.

3. $17.00 is not a valid market price because it could not be replicated on future orders. $18.50 is a more appropriate market price. The manufacturing manager was not acting ethically in this situation because he or she was withholding pertinent information from both upper management and the recycling division manager and was even promoting a position known to be false. If the transfer price had been changed to $17.00, it would not have affected the company overall, but profit incentive rewards would have been shifted away from the recycling division manager and to the manufacturing manager.

**22-35** (25 min.) **Transfer pricing, goal congruence.**

1. For each unit sold, Hauser receives a selling price of $32 and must incur a variable cost of $12 and a transfer price of $8 for the infrared LED from Croydon. Accordingly, Hauser’s incremental profits from each of the possible additional levels of monthly promotional expenses are as follows:

$ 80,000: (10,000 units) × ($32 – $12 – $8) – $ 80,000 = $40,000

$120,000: (15,000 units) × ($32 – $12 – $8) – $120,000 = $60,000

$160,000: (18,000 units) × ($32 – $12 – $8) – $160,000 = $56,000

It is in Hauser’s interest therefore to spend $120,000 on promotional expenses, thereby boosting profits by $60,000.

2. For each additional unit, Croydon receives a transfer price of $8 while incurring a variable cost of $4.80 for the infrared LED. Given this positive margin, and because Croydon does not have to internalize the promotional expense, it is in that division’s best interest to have as high a level of output as possible. Therefore, Croydon’s manager would like Hauser to spend the highest amount, $160,000, on additional promotional expenses, to generate additional volume of 18,000 units.

3. From the company’s standpoint, the transfer price across the divisions is not relevant. What matters are the external selling price of $32 and the variable costs of $4.80 and $12 for the two divisions. The company’s incremental profits from each of the possible additional levels of monthly promotional expenses are as follows:

$ 80,000: (10,000 units) × ($32 – $12 – $4.80) – $ 80,000 = $ 72,000

$120,000: (15,000 units) × ($32 – $12 – $4.80) – $120,000 = $108,000

$160,000: (18,000 units) × ($32 – $12 – $4.80) – $160,000 = $113,600

The company would also like Hauser to spend the maximum amount, $160,000, on additional monthly promotional expenses.

4. Note that the Croydon division and the company as a whole would like Hauser to spend $160,000, while Hauser itself benefits from spending just $120,000. To induce Hauser to increase promotional spending, it is clear that the transfer price for the infrared LED has to be lowered below $8. Letting the price be *p*, we can identify the values of *p* for which Hauser would prefer spending $160,000 to $120,000. Using the calculations in requirement 1, this requires:

(18,000 units) × ($32 – $12 – *p*) – $160,000 ≥ (15,000 units) × ($32 – $12 – *p*) – $120,000

 or (3,000 units) × ($20 – *p*) ≥ $40,000

 or *p* ≤ $6.67

Similarly, for Hauser to prefer spending $160,000 to $80,000, *p* must satisfy:

(18,000 units) × ($32 – $12 – *p*) – $160,000 ≥ (10,000 units) × ($32 – $12 – *p*) – $80,000

 or (8,000 units) × ($20 – *p*) ≥ $80,000

 or *p* ≤ $10

The maximum price that induces Hauser to act in the best interest of the firm is therefore $6.67. For any transfer price between $0 and $6.67, Hauser will invest $160,000 in additional monthly promotional expenses, and we have goal congruence.

**22-36** (30-35 min.) **Transfer pricing, perfect and imperfect markets.**

**SOLUTION EXHIBIT 22-37a**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Pounds of Ranbax Processed in S | 1,000 | 2,000 |  3,000 | 4,000 |
| Total Net Revenues ($) from Sale of Syntex |  $500 |  $850 | $1,100 | $1,200 |
| Incremental net revenues from processing next 1,000 pounds of Ranbax in S |  $500 |  $350 | $250 | $100 |
| Incremental net revenues per pound from processing next 1,000 pounds of Ranbax in S | $0.50 | $0.35 | $0.25 | $0.10 |

**SOLUTION EXHIBIT 22-37b**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Pounds of Ranbax Processed in T | 1,000 | 2,000 |  3,000 | 4,000 | 5,000 | 6,000 |
| Total Net Revenues ($) from Sale of Termix | $600 | $1,200 | $1,800 | $2,100 | $2,250 | $2,350 |
| Incremental net revenues from processing next 1,000 pounds of Ranbax in T | $600 | $600 | $600 | $300 | $150 | $100 |
| Incremental net revenues per pound from processing next 1,000 pounds of Ranbax in T | $0.60 | $0.60 | $0.60 | $0.30 | $0.15 | $0.10 |

1. The variable cost per pound of Ranbax is $0.18. From the last row of Solution Exhibit 22-37a, it is evident that for the first 3,000 pounds of Ranbax processed in S, the incremental net revenue per pound exceeds $0.18. However, the next 1,000 pounds following that generate only $0.10 per pound when converted to Syntex, which is below the variable cost of $0.18. Similarly, from the last row of Solution Exhibit 22-37b, it is in Letang’s interest to transfer 4,000 pounds of Ranbax to T to be processed into Termix.

 Letang should therefore produce 7,000 pounds of Ranbax overall and send 3,000 pounds to S and 4,000 pounds to T.

2. Division R will produce and ship Ranbax of any quantity up to its capacity of 10,000 pounds provided it gets a price not lower than its variable cost of $0.18 per pound.

 From Solution Exhibit 22-37a, Division S will be motivated to acquire exactly 3,000 pounds of Ranbax if the transfer price lies between $0.10 and $0.25 per pound.

 From Solution Exhibit 22-37b, Division T will be motivated to acquire exactly 4,000 pounds of Ranbax if the transfer price lies between $0.15 and $0.30 per pound.

 The set of transfer prices that will induce all three divisions to implement the plan found to be optimal in requirement 1 is given by the intersection of these three ranges. In other words, the transfer price must lie between $0.18 and $0.25 per pound of Ranbax.

3. If R can sell any quantity of Ranbax in a competitive market for $0.33 per pound, Letang will choose to have Ranbax processed further into Syntex or Termix only to the extent the incremental net revenue per pound exceeds $0.33.

 From Solution Exhibits 22-37a and 22-37b, Letang would therefore like to process 2,000 pounds of Ranbax into Syntex and 3,000 pounds of Ranbax into Termix.

 Because the variable cost of producing Ranbax is $0.18 less than the market price of $0.33, Letang will now choose to have Division R operate at capacity. The final 5,000 pounds of Ranbax will then be sold in the external market.

4. The presence of a competitive external market with a price higher than $0.18 implies that Division R will operate at capacity. Further, R must receive a transfer price of at least $0.33 per pound in order to transfer any units internally.

 From Solution Exhibit 22-37a, Division S will be motivated to acquire exactly 2,000 pounds of Ranbax if the transfer price lies between $0.25 and $0.35 per pound.

 From Solution Exhibit 22-37b, Division T will be motivated to acquire exactly 3,000 pounds of Ranbax if the transfer price lies between $0.30 and $0.60 per pound.

 The set of transfer prices that will induce all three divisions to implement the plan found to be optimal in Requirement 3 is given by the intersection of these three ranges. This implies that the transfer price must lie between $0.33 and $0.35 per pound of Ranbax.

 Of course, if the market is truly competitive, in the sense that Divisions S and T can also *purchase* Ranbax externally for $0.33 per pound, then there is a unique optimal transfer price, given by the market price of $0.33 per pound!